Factors influencing people's decisions to start fishing business around Lake Malombe, Malawi

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Abstract

A study to determine the factors that influence people's decisions to start fishing activities around Lake Malombe, Malawi was conducted between April to August 1996, using structured questionnaires with open-ended questions. A total of 331 respondents were interviewed. Using a logit model, small land holding sizes, large household sizes, having more male children and access to credit were identified as push factors to the fishing industry. It is recommended that viable income generating activities (IGAs) be explored and identified for the fishing community so that effort can be reduced.

Key words: fishing, logit model, income generating activities

Introduction

Lake Malombe and the Shire River contribute about 8 per cent of the total fish production in Malawi. Fish catches from Lake Malombe have dropped from 13,600 tonnes in 1986 to 5,600 tonnes per year in 1994. However, during about the same period, the number of fishermen has almost doubled. It seems likely that the increase in number of fishers may have influenced the decline in catches. Dorsey (1995) noted that excessive fishing effort in an open access fishery which the Malawi Fisheries Department was unable to completely regulate or control, led to the extraction of the lake's wealth.

Several reasons have been given as to contribute to why many people decide to start fishing activities. FAO (1990) observed that in developing countries many people engage into fishing activities because the job does not require training and capital (land). This is worsened by the fact that fish resource is not a private resource, hence the rent it may yield is not capable of being appropriated by one person. The result is a pattern of competition which may result in the dissipation of the intra-marginal ground.

On Lake Malombe, previous studies by the Malawi Fisheries Department have focused on biological aspects and have neglected socio-economics of the fishing communities. This study was aimed at shedding some light on the socio-economics of the fishing communities around the lake. In particular, the study was conducted to identify the main factors that influence people's decisions to start fishing. The study would come up with recommendations on possible ways that can stop people from entering the fishery, so as to reduce fishing effort. A hypothesis that large household sizes, lack of alternative income generating activities, low education, lack of land and social status are the main factors that influence people to start fishing activities was made.

Methodology

Both primary and secondary sources of information were used to collect the relevant data. The primary sources included informal discussions with experts and key informants like chiefs and staff of the Malawi Fisheries Department and fishermen. The fishermen in this case were the boat owners or those in charge of a fishing unit. Secondary sources of information consisted of published and unpublished literature from the Malawi Fisheries Department and other institutions/programmes such as the UNDP 5th Country Programme and the Ministry of Agriculture.

The survey was conducted around Lake Malombe from April to August 1996 using structured questionnaire with open-ended questions. Stratified random sampling technique was used to identify 331 respondents. This technique obtains unbiased and consistent estimates of the target population (stratification gives lower standard errors). The strata were based on those designated by the Malawi Fish-

eries Department as Lake Malombe East and Lake Malombe West.

Descriptive statistics including means, frequencies and percentages for various variables were calculated. Cross tabulations were made for the three groups of people namely the fishermen (FM), the Non-fishermen (NFM) and the crewmembers (CRW). Chi-square test was used to determine if socio-economic factors were significantly different among the three groups.

Factors influencing decisions to venture into fishing were examined through a Logit regression model.

$Y = f(X_1, X2, X3, X4, X5, X6, X7, X8, X9)$

where

Y = to become a fisherman
X_1 = age
X_2 = sex
X_3 = credit
X_4 = person does some IGA
X_5 = literacy level
X_6 = family size
X_7 = social status of the person
X_8 = father or uncle was a fisherman
X_9 = whether the person is land-less or not

The model was evaluated by examining the goodness of fit chi-square [-2 (LN (MLR)]. To test the significance of the entire model, the maximum likelihood ratio was used.

Description of the model

Dependent Variable Y This is the response variable and it is dichotomous in nature. This was incorporated into the model as dummy variable with the value 1 showing the person interviewed was a fisherman and 0 representing a non-fisher.

AGE (X_1) This is an explanatory variable that can influence one to become a fisherman. This was checked to find out if it has any influence on ones decision to become a fisherman. The old may feel its young men's' job and may not venture into the business. This is a quantitative vari able and was included in the regression in years.

Sex (X_2) This was recorded in the model as dummy variable with 1 if the respondent is male and 0 if the respondent is female. This variable was included in the model to examine if gender had any effect on influencing someone to become a fisherman. It is expected that more of the fishermen will be male because of the nature of the job and hence the more male children are born, the more fishermen you should expect.

Credit (X_3) This was included to find out if access to credit has any influence in ones' ability to become a fisherman. The value 1 indicated that a person has access to credit and 0 no access to credit. It is expected that adoption of fishing be positively related to credit access as credit may be used to finance capital acquisition. Since there are fewer profitable businesses around the area, recipients of credit are more likely to become fishermen than those that do not have access to credit since fishing would be the only option for them. Therefore, one would say that adoption of fishing is positively related to credit access.

IGA (X_4) This variable was to examine whether those involved in other income generating activities do not become fishermen. This was trying to substantiate the fact that fishing is the last resort income for the people that do not have any other income generating activ-ities. This was a dummy variable with 1 indicating he/she was involved in other IGAs and 0 indicating no other IGAs. It can therefore be said that adoption of fishing is negatively related to IGA since those involved in other IGAs will not adopt fishing.

Education (X_5) Those with education would move to cities and other places to work and this would take them away from their homes. The hypothesis that was tested was to find out whether fishermen are illiterate people. Those that do not read or write would be considered to be illiterate and were recorded as 0 and those that were able to read and write were considered literate and given value 1. Adoption of fishing is therefore considered to be negatively related to education.

Family size (X_6) Those with large family sizes would likely be involved in fishing, as they would not have enough resources to take care of the family members. Therefore some members would sell their labour or use traditional methods of fishing and become fishermen. Adoption of fishing is expected to be positively related to family size. This was recorded numerically.

Social Status (X_7) If there were some barriers to entry in fishing by local leaders, it was likely that only those with some status would be allowed to operate as fishermen. These would be influential people and would have access to some resources that those with no status would not have. Here 1 depicted

that a person had some status in the society and 0 showed that a person did not have any status. Adoption of fishing is positively related to social status.

Land holding size (X_8) Those that are land-less venture into fishing either as a fisherman or as a crewmember. It is therefore expected that a negative relationship should exist between adoption of fishing and land holding size. This was recorded in hectares.

Relative fisherman (X_9) Some become fishermen because their father or their uncles were fishermen and they learnt the skill from their fathers or they even inherited the gear from them. This was recorded as a dummy variable with 1 showing that a person had a father or uncle who was a fisherman and 0 showing that a person did not have any relative who influenced him to become a fisherman. A positive relationship should exist between adoption of fishing and relative fisherman.

A bivariate (Chi-squared) analysis was carried out to find out how each of the explanatory variables relates to the dependent variable. This analysis was also carried out to find out if the influence of each of the variables was significant. The results of the analysis showed that education, social status, age and relative being a fisherman were not significant contributors to influencing a person to become a fisherman. Those with large household sizes, those with no other income generating activities, those with little land and those that have access to credit are likely more to become fishermen than the rest. Likewise more males become fishermen than females. The analysis showed that land, sex, IGA, credit, and household sizes were associated $p < 0.05$ with becoming a fisherman.

Model estimation The regression was first run to include all the variables namely age, sex, literacy, social status, IGA, land, relative being a fisherman, household size and credit. This was done because some variables on their own may not be significant. However, their interaction with other variables may show that they contribute to influencing people to becoming fishermen. Variables that were insignificant were dropped from the model so were those that were highly correlated with the other variables. This was done to avoid multicollinearity. The final model contained the following independent variables; sex (X_2), IGA (X_4), credit (X_3), household size (X_6) and land (X_9) as the independent variables.

The stimulus index is given as

$$Z_i = \ln [P_i / (1 - P_i)]$$
$$= b_o + b_2X_2 + b_3X_3 + b_4X_4 + b_6X_6 + b_9X_9$$

Results

The logistic regression coefficients for the factors influencing people to become fishermen are found in Table 1.

The goodness of fit chi-square -2 (LN (MLR) shows that the model fits the data (significant at $p < 0.001$). Since the purpose of the model is to identify main factors that make people go into fishing, the model was found to be appropriate for the purpose considering its highly significant goodness of fit chi-square and high predictive ability.

-2 Log Likelihood = 228.942
Goodness of Fit = 191.399
Prediction of success = 65.95 %

Therefore, the model can be estimated as;

$$Y = 1.791 + 0.186X_9 + 1.391X_3 - 2.299X_2 + 0.079X_6 - 0.512X_4$$

Discussion

Results suggest that people are more likely going to go into fishing if there are no any other profitable business in the area. Therefore, one would say that lack of alternative source of income would induce people to venture into fishing, as it is an open access resource. The model suggest that giving more people credit in form of cash will result in having more fishermen and thus putting pres-

Table 1. Logistic regression coefficients of the factors influencing people to go into fishing in Lake Malombe.

Variable	Xi	Coefficient	F-value
Constant		1.791	0.087
Sex	X2	-2.299	0.008*
Credit	X3	1.391	0.011*
IGA	X4	-0.512	0.112*
Household size	X6	0.079	0.171*
Land	X9	0.186	0.073*

sure on the fishery. This is so because the fishing communities look at fishing as the only most important income generating activity. Results of the model have also shown that having more income generating activities around the lake will relieve effort exerted on the fishery. This is witnessed by the negative coefficient. The people will now concentrate on other IGAs and if they are more profitable than fishing a lot of the fishermen will abandon their fishing nets.

Household size is found to positively influence people to venture into fishing. The more children one has the higher the probability that the number of fishermen will increase. If the children are male then the probability gets even higher. This is so because males dominate fishing activities.

In summary, results from the logit model has shown that small land holding sizes, large household sizes, having more males and access to credit as push factors to the fishing industry. More importantly, having other income generating activities reduces the number of fishermen and thus reduces effort. Therefore, there is need to explore alternative IGAs for fishermen if fishing effort is to be reduced.

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